CLAIMS

1. A semiconductor photodetector comprising:

a semi-insulating substrate having an upper step surface, a middle step surface, and a lower step surface with their respective heights different from each other in a top surface portion, the lower step surface being located between the upper step surface and the middle step surface;

a first semiconductor layer formed immediately above the lower step surface, having a first top surface portion of a flat surface shape with a height equal to that of the middle step surface and a second top surface portion with a height equal to or higher than that of the first top surface portion, and comprising a first impurity;

a second semiconductor layer formed above the second top surface portion of the first semiconductor layer, having a top surface portion of a flat surface shape with a height equal to that of the upper step surface, and comprising a second impurity;

a first electrode provided astride and above the first top surface portion of the first semiconductor layer and the middle step surface of the semi-insulating substrate; and

a second electrode provided astride and above the top surface portion of the second semiconductor layer and the upper step surface of the semi-insulating substrate.

2. The semiconductor photodetector according to Claim 1, further comprising a third semiconductor layer formed

between the first semiconductor layer and the second semiconductor layer and having a carrier density lower than that of the first semiconductor layer or the second semiconductor layer.

3. The semiconductor photodetector according to Claim 1 or 2, wherein a ramp portion consisting of a level difference between the upper step surface and the lower step surface of the semi-insulating substrate is inclined in a radial direction of a depression formed by the upper step surface and the middle step surface, in a direction from the lower step surface to the upper step surface.

4. A method of production of a semiconductor photodetector comprising:

a first step of forming a recess with a predetermined depth in a semi-insulating substrate by etching;

a second step of forming a stack of a first semiconductor layer comprising a first impurity and a second semiconductor layer comprising a second impurity, selectively only in the recess of the semi-insulating substrate formed in the first step;

a third step of further etching a part of the semi-insulating substrate so as to expose at least a portion of the first semiconductor layer formed in the second step; and

a fourth step of laying a first electrode in contact with the exposed portion of the first semiconductor layer exposed in the third step and laying a second electrode in

contact with the second semiconductor layer above the semi-insulating substrate.

5. The method according to Claim 4, wherein the second step is to form the stack of the first semiconductor layer and the second semiconductor layer by vapor deposition.

6. The method according to Claim 4 or 5, wherein the first step is to form the recess of the semi-insulating substrate so that at least a side wall portion on the second electrode side among side wall portions in a sectional shape along a direction connecting the first electrode to the second electrode, is of an inverted mesa shape.